DEVELOPING INTERPERSONAL ABILITIES WITH INTERACTIVE VIGNETTES

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ABSTRACT

As COL Jon Moilanen and LTC Donald Craig noted in a *Military Review* article (May-June 2000, pg. 13), "Leaders must possess the interpersonal skills necessary to develop and sustain high-performance combined arms teams, as well as work with other services and nations during mission accomplishment… These teams may routinely deploy as part of a coalition to locations with immature transportation and logistic infrastructures and uncertain political situations—conditions requiring high levels of innovation and cultural awareness." This paper discusses an innovative training prototype that not only targets the development of interpersonal ability in junior officers, but also incorporates many of the situational elements described in the previous quote. This paper will discuss three studies of the prototype, as well as lessons learned about implementing interactive training software in military settings.

1. INTRODUCTION

Many training packages have failed to capitalize on the full potential of new technologies for creating student-centered learning environments. As a result, many training tools are little more than online textbooks or are so technology-driven that the learner is treated as an afterthought (Hakkinen, 2002; Mayer, 2001; Moreno, Mayer, Spires, & Lester, 2001). However, interactive multimedia can be leveraged to create training tools that engage the learner and facilitate training transfer to new situations (Mayer, 1996, 2001). Effective multimedia training tools possess several characteristics:

1. Training should include immersive, realistic, and complex cases that are based in concrete experience (Hannafin, Hill, & Land, 1997; Jonassen, 2002; Lesgold, 2001).
2. Material should be both verbally (e.g., written and audible words) and visually stimulating, because individuals process verbal and visual information through different channels (Mayer, 2001, 2004). Learning is enhanced when both channels are tapped concurrently, because the trainee is able to connect the verbal and visual representations, resulting in a coherent and elaborate knowledge representation (Mayer & Sims, 1994).
3. Allowing trainees to control the order and flow of information can help trainees reduce cognitive load (Mayer, Dow & S. Mayer, 2003).
4. Tools should pose thought-provoking questions to cognitively engage and orient trainees (Chi & VanLehn, 1991; Martin & Pressley, 1991; Mayer, Dow, & S. Mayer, 2003; Willoughby, Wood, Desmarais, Sims, & Kalra, 1997).
5. Having trainees generate questions can aid in comprehension and active processing of material (Rosenshine, Meister, & Chapman, 1996).
6. Tools that use pedagogical agents (e.g., computerized instructors) encourage trainees to view training as an interaction with a human rather than a machine, which can contribute to gains in learning (Atkinson, 2002; Mayer, Sobko, & Mautone, 2003; Moreno et al., 2001).
7. Training should emphasize thinking processes instead of "correct answers" (Hannafin et al., 1997; Jonassen, 2002) because many real world problems do not have right or wrong answers, only better and worse approaches.

In conjunction with the Institute for Creative Technologies (ICT) at the University of Southern California, the Army Research Institute (ARI) developed Think Like a Commander—Excellence in Leadership (TLAC-XL), an interactive training tool that incorporates many of the above listed characteristics. TLAC-XL combines Hollywood storytelling with interactive computer software to provide trainees with an educational experience that is exciting, immersive, and cognitively challenging. TLAC-XL consists of two parts: a case study and an interactive computer module.

During the *case study* phase of TLAC-XL, trainees watch a 13-minute film called *Power Hungry* in which a battalion is tasked with securing a site for a non-

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government organization (NGO) to distribute food in Afghanistan. The captain (CPT) in charge of the site is confronted with several problems, including unfavorable terrain, tactical disadvantages, and Afghan warlords. The *Power Hungry* film is unique from typical case studies and training videos in that the story was written, filmed, edited, and performed by Hollywood professionals (Figure 1). The result is a film that achieves the quality of a major motion picture, while still carrying the substantive content of an educational product. The case study itself encompasses six teaching themes identified as important leadership issues by CPTs on the faculty at the United States Military Academy (USMA): mission clarity, shared vision of intent, command influence, setting a model of command, cultural awareness, and respect for experience. These themes represent elements of the mission that needed to be achieved in order to attain mission success, but were not achieved due to the poor quality of interpersonal interactions among film characters.

Figure 1. An Afghan warlord expresses his anger to an American Soldier in *Power Hungry*.

The second part of TLAC-XL consists of an *interactive module* to help trainees reflect on and discuss specific elements of the *Power Hungry* case study. In the interactive module, a computerized mentor leads trainees through a sequenced series of questions designed to stimulate reflection on the teaching themes. Additionally, each main character embodies a teaching theme, and the mentor presents trainees with an opportunity to interview that character when a specific teaching theme is the focus of discussion. Trainees use a natural dialogue interface to interview characters, and the interviews allow trainees to discover new information about the scenario. Trainees are able to both hear and see characters speaking their answers (Figure 2).

By the end of training, trainees should emerge with a better understanding of how the interpersonal behaviors of a leader are intertwined with tactical outcomes and team processes. Trainees also should have built a conceptual model that indicates how interpersonal interactions are related to each teaching theme. The next sections present three studies that examined learning with

respect to the teaching themes and reactions to the TLAC-XL software.

Figure 2. In the upper left, CSM Pullman responds to a trainee question about his influence on CPT Young. The computerized mentor is located in the bottom right.

2. STUDY 1: CAS3

Two classes at the Combined Arms and Services Staff School (CAS3; $n = 26$) volunteered to use TLAC-XL as part of their lesson on ethical decision-making. CPTs interacted with TLAC-XL in groups of two to five and completed surveys at three points during training: before the film, immediately after the film, and immediately after completing the interactive module. The majority of survey items were on a seven-point scale ranging from *strongly disagree* (1) to *strongly agree* (7); a rating of 4 indicated neutrality toward the statement.

Unless otherwise noted, one-sample t-tests were used to examine whether item ratings differed significantly from a test-value of 4 (neutral). Overall, results suggest that both the film and software received positive reactions (Table 1). CPTs reported that the film was involving, interesting, and realistic, and the software was valuable and easy to use. However, CPTs reported that characters often were unresponsive to their questions, indicating that the natural dialogue interface needs to better map student questions to character answers. Despite problems with the natural language interface, CPTs reported that they learned about the various teaching themes. CPTs reported that the training gave them a strong understanding of cultural awareness and respect for the experience of non-commissioned officers, and reactions toward the lessons of shared vision of intent and mission clarity also were favorable. The themes of model of command and command influence did not appear as salient as the other four teaching themes. This finding might stem, in part, from the behavior of the lead character, CPT Young, who served as a poor model of command. While the case study easily stimulated discussion about the many things that

CPT Young did wrong, the software spent relatively less time steering discussion toward things he could have done to be an effective leader.

In addition to survey items, CPTs completed a self-report measure of arousal before and after the film. A dependent samples *t*-test indicated that CPTs reported a higher level of arousal after the film than before the film, providing further evidence that the film was emotionally engaging, $t(24) = 5.66$, $p < .001$.

Table 1
Means, Standard Deviations and T-values for Survey Items

Reaction	M	SD	t(25)
Film			
Involving	5.46	1.27	5.86*
Interesting	6.15	1.12	9.80*
Realistic	4.96	1.84	2.66*
Confusing	2.15	1.41	-6.70*
Boring	2.04	1.18	-8.46*
Software			
Training Value	5.03	1.81	5.43*
Ease of Use	4.95	1.23	4.80*
Easy to Control	4.56	1.33	2.64*
Character Responsiveness	3.08	1.63	-3.54*
Teaching Themes			
Mission Clarity	4.59	1.31	2.81*
Command Influence	4.00	1.21	0.00
Shared Vision	4.64	1.04	3.86*
Model of Command	3.90	1.31	-.49
Cultural Awareness	5.54	1.12	8.58*
Respect for Experience	5.21	1.22	6.18*

* $p < .05$; One-sample *t*-test against a test-value of 4 (neutral)

In sum, findings from Study 1 indicated that the film was immersive, energizing, and realistic, which is an important feature of training for the complexity inherent in the real world (Hannafin et al., 1997; Jonassen, 2002; Lesgold, 2001). Results also suggested that TLAC-XL is appealing software that will aid in training several of the leadership themes identified as important to missions overseas. However, TLAC-XL's natural dialogue feature encountered difficulty in matching students' questions to answers stored in the database of character answers.

3. STUDY 2: TWO INTERACTIVE PACKAGES

It should be noted that TLAC-XL is a prototype created for research purposes, not a finalized training product. Because of its prototype status, TLAC-XL has several limitations. First, as noted in the CAS3 study, the natural dialogue interface is problematic in that the software often misclassifies trainees' text. Consequently,

trainees often receive feedback from the mentor and characters that is non-responsive to what they typed into the computer. Second, the amount and type of information that trainees access about the scenario is contingent on the quality of the questions that they ask the characters. Thus, many trainees may not access vital information about the scenario because they do not know the appropriate questions to ask. This problem is exacerbated when trainees possess limited background knowledge or are unable to identify what they need to learn (Graesser & Olde, 2003). Third, complete exploration of all possible character responses while using the conversational interface is time intensive and cognitively demanding, which might result in fatigue effects and decreased motivation. Fourth, TLAC-XL forces trainees to interview characters in a predetermined order. The lesson is sequenced so that the mentor queries trainees about a teaching theme, and then presents a character for trainees to interview. Once trainees have interviewed a character, they summarize their interaction with the character and then proceed to discussion of the next theme. While the benefit of such structure is to focus trainee attention on one theme at a time, this structure precludes trainees from returning to a character once an interview is completed. This one-shot-interviewing feature makes it difficult for trainees to integrate comments across characters.

A second interactive prototype was created using Microsoft PowerPoint (TLAC-PP) to provide a comparison technology for TLAC-XL, as well as address some of TLAC-XL's limitations. PowerPoint was chosen as an alternative technology because it is low-cost and readily available. In TLAC-PP, the case study is presented as a series of pictures from the film with the film audio running in the background. While the presentation of the case study might not be as sophisticated in TLAC-PP, the interactive module offers some advantages over TLAC-XL. In TLAC-PP, trainees have significantly more freedom to explore characters in any order they choose. Trainees can select any character they want from a "cast of characters," and then are presented with a list of all possible questions to which the character has the answers. Unlike TLAC-XL, trainees can see and access all information available about the case study, so trainees do not need as much base knowledge to generate relevant questions to ask characters. TLAC-PP also does not use a computerized mentor to lead trainees through a structured discussion of the teaching themes. Instead, mentor questions (minus the mentor) are presented as a series of discussion question slides that can be accessed at any point during the interactive module.

Ultimately, both TLAC-XL and TLAC-PP present approximately the same information, but substantive differences exist with respect to how the interfaces shape trainee exploration of teaching themes. TLAC-XL draws

on a guided discovery and natural dialogue approach that focuses trainees on one theme at a time. Each character represents a theme, and opportunities to interview characters are in a sequenced order. Conversely, TLAC-PP does not present themes in a predetermined order, but allows the trainee to freely explore characters with minimal structure imposed. The benefit is that scenario information is more easily accessed; however, without the sequenced presentation of teaching themes, trainees may not attend to information in a manner consistent with training objectives (Mayer, 2004). The next several paragraphs present research that compared the two training prototypes with respect to several criteria, including trainee reactions, memory, interactive efficiency, and learning.

3.1 Method

Thirty-three lieutenants (LTs) and 36 CPTs from three FORSCOM installations were randomly assigned to either a TLAC-XL ($n = 35$) or TLAC-PP ($n = 34$) training session. No significant differences existed between LTs and CPTs on the variables of interest, so their data are reported together. Training sessions consisted of one to five officers gathered around a laptop computer, with a modal group size of three ($M = 3.35$). Group sizes were reasonably equivalent in the two training conditions. Most training sessions consisted of Soldiers of similar rank.

Trainees first watched the case study and then completed several measures that assessed reactions to the case and memory of scenario details. First, trainees completed the Positive and Negative Affect Schedule (PANAS; Watson & Tellegen, 1988); trainees indicated the extent to which they experienced 20 emotions during the case study on a scale of 1 (*very slightly or not at all*) to 5 (*extremely*). Positive affect ($\alpha = .88$) was the mean of 10 positive emotions; negative affect ($\alpha = .86$) was the mean of 10 negative emotions. Trainees also answered four items about how suspenseful, realistic, confusing, and boring the case study was using a seven-point scale ranging from *strongly disagree* (1) to *strongly agree* (7). Additionally, trainees responded to an item about how well the story communicated the thoughts, feelings, and emotions of the characters; this item served as an indicator of how well the medium conveyed the personality and complexity of the characters. After completing reaction measures, trainees completed a memory test that consisted of 24 true/false items. In addition to true/false response options, trainees were told to select a "don't know" option if they had to guess about the truthfulness of a statement. A 25th item that was neither true nor false functioned as a manipulation check to ensure that trainees viewed "don't know" as a viable response alternative; 82.4 % of individuals responded "don't know" to this item. Memory was operationalized as the percentage of the 24 items answered correctly.

Once trainees completed the first set of measures, trainees engaged in the interactive module and completed a second series of measures. Trainees responded to items that addressed general reactions to the training product, character interview features, and mentor/discussion question features. Items again were anchored on a seven-point scale. In addition to reactions to the software, learning was assessed using nine open-ended questions that required conceptual integration of training material across the leadership themes. Two raters independently scored trainee answers and later met to reconcile any scoring discrepancies.

Researchers also created two variables that functioned as indices of interactive efficiency. First, the number of unique character responses heard during the interactive module was summed to indicate how much information was accessed during computer interaction. Second, trainees were timed with respect to how long they spent exploring and discussing in the interactive module.

3.2 Results

Independent samples *t*-tests were conducted to compare TLAC-XL with TLAC-PP with respect to trainee reactions, memory, interactive efficiency, and learning. Results indicated that reactions were more positive for the film than the PowerPoint presentation of the case study (Table 2). Trainees rated the film as more realistic and suspenseful and less confusing and boring than the PowerPoint presentation. Additionally, trainees reported that the film did a better job at conveying the thoughts, feelings, and emotions of the characters, $t(67) = 2.80$, $p < .01$, suggesting that character personality is better communicated through the film medium. With respect to affect, the film ($M = 3.09$, $SD = .73$) evoked more positive affect than did PowerPoint ($M = 2.63$, $SD = .73$), $t(67) = 2.60$, $p < .05$, but no significant differences existed between the film ($M = 1.91$, $SD = .69$) and PowerPoint ($M = 1.67$, $SD = .66$) with respect to negative affect, $t(67) = 1.44$, $p = $ ns. Overall, these results suggest that the film is more emotionally engaging than the PowerPoint presentation.

With respect to memory, trainees exposed to the film ($M = 65.48$, $SD = 11.23$) remembered more details about the scenario than did trainees exposed to PowerPoint ($M = 50.12$, $SD = 14.12$), $t(67) = 5.01$, $p < .001$. Because the same audio was present in both the film and PowerPoint versions, these findings suggest that complex case studies are more memorable and cognitively engaging when presented as a dynamic visual presentation rather than as a series of static pictures.

With respect to the overall training packages, trainee reactions were similar in both conditions (Table 2). Trainees indicated that both tools were valuable and easy

to use. In both training conditions, trainees also reported that character interviews provided them with insight about why the mission failed. However, TLAC-PP performed better than TLAC-XL in two respects. First, trainees reported that characters were less responsive to their questions in TLAC-XL than in TLAC-PP. Second, trainees rated the mentor's use of questioning as significantly more annoying than TLAC-PP's use of discussion question slides.

Table 2
Means, Standard Deviations, and T-Values
for Reactions to the Two Training Tools

	TLAC-XL		TLAC-PP		
Reactions	*M*	*SD*	*M*	*SD*	*t(67)*
Case Study					
Confusing	1.91	1.44	3.03	1.70	-2.95*
Suspenseful	5.54	1.25	4.94	1.10	2.13*
Realistic	5.66	1.21	4.94	1.21	2.46*
Boring	1.89	1.21	2.56	1.24	-2.29*
Characters Had Personality	5.37	1.11	4.59	1.21	2.80*
Software					
Training Value	5.17	1.47	5.06	1.13	.36
Ease of Use	5.34	1.24	5.29	1.40	.15
Easy to Control	4.80	1.28	5.15	1.40	-1.08
Character Gave Me Insight	5.31	1.55	5.53	.96	-.70
Character Responsiveness	3.11	1.53	4.41	1.58	-3.47*
Mentor Was Annoying [a]	4.46	1.48	3.47	1.37	2.83*

* $p < .05$; [a] the word "mentor" was replaced with "discussion questions" on the survey for trainees in the TLAC-PP condition.

On average, trainees spent more time in the interactive module of TLAC-XL ($M = 46.66$ minutes, $SD = 13.21$) than in the interactive module of TLAC-PP, ($M = 33.06$ minutes, $SD = 10.38$), $t(67) = 4.75$, $p < .001$. Although trainees spent more time interacting with TLAC-XL, trainees did not access as much information in TLAC-XL ($M = 20.02$ character statements, $SD = 6.13$) as they did in TLAC-PP ($M = 30.08$ character statements, $SD = 18.36$), $t(67) = -3.02$, $p < .01$. Thus, the TLAC-PP format appears to have an advantage over TLAC-XL in allowing trainees to access more information about the scenario in a shorter amount of time.

Although trainees were able to access more information in TLAC-PP, trainees did not learn more in TLAC-PP ($M = 8.38$, $SD = 2.83$) than in TLAC-XL ($M =$

9.19, $SD = 3.16$), $t(67) = 1.11$, $p =$ ns. Indeed, when conducting an analysis of covariance to statistically control for the amount of information that trainees accessed, TLAC-XL was superior with respect to learning, $F(1,66) = 5.48$, $p < .05$. Such findings suggest that, if mechanisms could be emplaced in TLAC-XL that would ensure trainees were exposed to important information, the benefits of posing questions, asking questions, pedagogical agents, and structured exploration might be better achieved.

3.3 Summary of Study 2 Results

The results of Study 2 suggested several things. Presentation of the case study in a film format appeared to be superior to a PowerPoint format. Specifically, the film was emotionally more engaging, as evidenced by trainee interest and involvement and the relatively stronger experience of positive affect. The film also appeared to be more cognitively engaging than the PowerPoint format, as evidenced by better memory of scenario details and reports that the film was less confusing than PowerPoint. Additionally, the story presented in a film format was reported as more realistic than the same story presented in a PowerPoint format, and character personality appeared to be conveyed more strongly in the film format.

Several interesting findings emerged in the comparison between TLAC-XL and TLAC-PP. Both TLAC-XL and TLAC-PP were rated as valuable and easy to use tools. Trainees also reported that the character interviews gave them insight into the scenario, even though the character interrogation features were very different between TLAC-XL and TLAC-PP. With respect to character interrogation features, trainees reported that the characters were significantly less responsive to questions in TLAC-XL than in TLAC-PP. This finding is not surprising for a couple of reasons. First, as mentioned in Study 1, the natural dialogue software is sometimes inaccurate in matching trainee questions to character answers. Second, TLAC-PP explicitly lists the questions to which the characters had answers. What should be more surprising is that character responsiveness in TLAC-PP was rated relatively low ($M = 4.41$) given that the listed questions were explicitly created to match character answers. This might be due, in part, to the nature of the character personalities themselves. Some characters were a bit cagey or defensive in their answers, just as real people might be when faced with accepting responsibility for a disastrous mission. Another explanation for the low ratings might be that the questions that trainees wanted answered did not appear in the list of character questions.

With respect to learning, TLAC-XL and TLAC-PP produced the same results. Given that TLAC-PP presented the same amount of information in less time

and would likely cost less to develop, a logical conclusion might be that TLAC-PP is a better training tool. However, several things should be taken into consideration before adopting this conclusion. First, when controlling for the amount of information that trainees were exposed to, TLAC-XL actually resulted in better comprehension and integration across the six teaching themes than did TLAC-PP. This suggests that, if TLAC-XL could take a more proactive approach in ensuring that trainees are exposed to more character dialogue, then TLAC-XL would be able to capitalize on the benefits of using questions, pedagogical agents, and guided discovery. Conversely, some of the aspects of TLAC-XL might be incorporated into TLAC-PP, such as a more structured approach to presenting material and compelling trainees to generate questions they would like to know about the scenario. Second, although we explored results on a knowledge test and found no differences between the two training packages, the real question is which training package is more likely to result in changes in behavior. Given that the film is more memorable and emotionally engaging, behavioral transfer actually might be more likely with TLAC-XL because Soldiers who encounter a similar situation in a real mission will be better able to compare what they remember about the training scenario to the situation in which they are currently immersed.

4. STUDY 3: THE FILM AS A CASE STUDY

One of the most appealing aspects of TLAC-XL is the wide variety of ways in which the training software can be used as an instructional tool. Although the original training concept was that a computerized mentor would assist up to four CPTs through discussion of the case study, portions of TLAC-XL can be used in the context of larger training audiences. Specifically, a human instructor can lead discussion of the film for a larger training group, and the instructor can either focus on the original six teaching themes or construct new lessons around different teaching points. Moreover, the incorporation of a human instructor allows TLAC-XL to be used with a broader training audience, such as NCOs, because the instructor can tailor discussion to the knowledge, skill, and ability levels of a given training group. The 1/25 ID Stryker Brigade Combat Team has used the film in such a way in several of their Stryker Leader Training Courses, and this section reports survey results from the March 2003 Stryker Leader Course.

Approximately 23 Soldiers (primarily Sergeants) watched the film as a group. After watching the film, trainees broke into four groups in which instructors facilitated discussion about the film for approximately 20-30 minutes. After discussing the film in small groups, trainees gathered into the large group and discussed for several additional minutes. When discussion was finished,

21 of the trainees completed surveys about their reactions to the film and the discussion.

Overall, survey results indicated that Soldiers reacted positively to the film and lesson. Similar to Studies 1 and 2, trainees reported that the film was interesting, involving, and realistic (Table 3). Many trainees indicated that participating in small group discussion and vocalizing their opinions was useful, and indicated that the discussion helped them to learn about the six teaching themes. As in Study 1, cultural awareness and respect for experience appeared to be the most salient lessons, while setting a model of command and command influence were the weakest lessons. In addition to the original teaching themes, trainees reported that they discussed and learned about additional topics that were brought up in their discussion groups. For example, trainees reported that they learned about adaptive thinking, visualizing the battlefield, preparing for contingencies, and timing.

Table 3
Means, Standard Deviations and T-values for Survey Items

Reaction	M	SD	t(20)
Film			
Involving	6.48	.81	13.95*
Interesting	6.52	.87	13.25*
Realistic	6.10	.94	10.18*
Confusing	2.71	1.98	-2.98*
Boring	1.33	.73	-16.73*
Lesson and Discussion			
Value of Training Tool	5.95	.92	9.72*
Value of Group Discussion	6.00	1.27	7.25*
Unresponsive to Training Needs	2.62	1.53	-4.13*
Matched My Learning Style	5.43	1.29	5.09*
Original Teaching Themes			
Mission Clarity	5.71	1.19	6.61*
Command Influence	5.19	1.33	4.11*
Shared Vision	5.71	1.27	6.18*
Model of Command	4.90	1.55	2.68*
Cultural Awareness	6.67	.66	18.56*
Respect for Experience	6.48	1.08	10.53*
Additional Teaching Themes			
Adaptive Thinking	5.71	.90	8.71*
Preparing for Contingencies	5.90	1.22	7.15*
Terrain	5.43	1.75	3.74*
Seeing the Big Picture	5.29	1.31	4.50*
Timing	6.19	1.17	8.60*
Visualizing the Battlefield	5.81	1.17	7.11*
Using Assets	6.00	1.14	8.04*

*p < .05; Ratings based on a 7-point scale ranging from *strongly disagree* (1) to *strongly agree* (7). T-values based on a one-sample *t*-test with a test value of 4 (neutral).

Trainees were asked to indicate what could be improved about the training. Approximately 17% of trainees indicated that they wanted more time allotted for discussion. Approximately 24% wanted more scenarios to discuss.

Study 3 is interesting because it demonstrates the flexibility of the TLAC-XL software. While Studies 1 and 2 focused on the TLAC-XL software in its entirety, Study 3 extends TLAC-XL beyond its original training concept. First, this study indicates that a human trainer can facilitate discussion in the absence of a computerized mentor. Moreover, because the *Power Hungry* film is realistic and complex, the instructor can expand the discussion beyond the six original teaching themes to focus on immediate training needs. Another important aspect of Study 3 is that, because of the film quality and the skill of the instructors, training can be broadened to accommodate enlisted Soldiers. Study 3 also established that training could be applied to large group settings.

As a side note, the best indicator of the effectiveness of TLAC-XL with the Stryker training audience is that the film was used again with the 1/25 ID in August 2003. However, in that implementation, trainees conducted discussion in a large discussion group for a longer period of time (approximately 90 minutes). The film also was used in similar manner at Fort Wainwright in December 2003.

5. GENERAL DISCUSSION

Across the three studies, the film appears to be an optimal mode of presentation for a case study about interpersonal interactions and leadership issues. The film captures the interest of trainees and is emotionally arousing and engaging, realistic, and memorable. More importantly, the film is based on interpersonal issues actually encountered by officers who were deployed overseas.

With respect to the interactive module, results point to both positive and negative features. In Studies 1 and 2, TLAC-XL was rated as a valuable and easy to use training tool. Additionally, in Study 2 trainees indicated that they thought that the character interviews provided them insight into the scenario and the reasons for mission failure. However, not all character and mentor features were rated positively. Although previous research supports the use of social agents in interactive technology (Atkinson, 2002; Mayer, Sobko, & Mautone, 2003; Moreno et al., 2001), the results of Study 2 indicated that trainees thought the computerized mentor was annoying.

More problematic is that the natural dialogue interface did not accurately match trainee questions to character answers in the software database (Studies 1 and 2). Unfortunately, this problem is common in training programs that attempt to incorporate a conversational interface (e.g., Ryder, Graesser, Le Mentec, Louwerse, Karnavat, Popp, & Hu, 2004). In Study 2, TLAC-PP skirted this problem by presenting lists of character questions for which characters had answers. Question lists served a more important function than merely shaping trainee reactions, however. Question lists helped trainees to visualize what information was available and access that information in an expedient fashion. As a result, trainees were able to access more information in less time. Only after statistically controlling for the amount of information that trainees accessed did TLAC-XL emerge as a better tool for learning. These findings suggest that many positive elements of TLAC-XL, such as structured sequencing of teaching themes and forcing question generation, will only optimize learning to the extent that the training tool ensures that relevant information is provided to the trainee. One possible solution is to allow the mentor to intervene on behalf of novice trainees who do not ask the right questions; the mentor could tell trainees what sorts of questions they should ask characters or could pose a few character questions himself. Such an approach would not only ensure that trainees were exposed to relevant information, but also would allow the mentor to serve as an expert model for the types of questions that should be asked in making sense of complex and uncertain situations.

In Study 2, TLAC-PP allowed for greater freedom to explore the situation than did the structure imposed by TLAC-XL. However, the lack of structure inherent in TLAC-PP might have been problematic for some trainees. Results indicated large variability (i.e., $SD = 18.36$ character statements) with respect to how much trainees explored the interactive environment in PowerPoint. Some trainees did not explore all six characters, while other trainees virtually clicked on the majority of character responses available. Lack of exploration in TLAC-PP could be due to motivational problems or the inability to correctly identify gaps in knowledge that require further exploration (Graesser & Olde, 2003; Mayer, 2004). Thus, trainers must weigh the advantages and disadvantages of imposing structure with the freedom of exploration in order to find a balance that will best accomplish training goals (Mayer, 2004).

Study 3 presents a way in which some components of TLAC-XL can be immediately put into practice while problems of the natural dialogue interface are addressed. Specifically, trainers can use the film as a case study to discuss the six teaching themes or other issues as identified as important training topics (e.g., what it is like to conduct a stability and support operation). An additional benefit of having a human conduct discussion is that the trainer can tailor the discussion to fit the

knowledge, skills, and abilities of the training audience. To that end, ARI has created an instructor's manual for how trainers can use the film as a case study to talk about leadership issues (Zbylut & Ward, 2004).

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